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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/909,992	07/23/2001	Susan Davis Allen	FSU-0004	1377

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EXAMINER

WINTER, GENTLE E

ART UNIT	PAPER NUMBER
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1746

DATE MAILED: 06/03/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/909,992

Applicant(s)

ALLEN, SUSAN DAVIS

Examiner

Gentle E. Winter

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 18 April 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-21 is/are pending in the application.
- 4a) Of the above claim(s) 14-21 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-13 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☒ Claim(s) 14-21 are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
- 4) ☒ Interview Summary (PTO-413) Paper No(s). 10.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

Election/Restrictions

1. Applicant's election with traverse of Group 1 (claims 1-13) in Paper No. 9 is acknowledged. The traversal is on the ground(s) that the search and examination of the entire application could be made without serious burden. This is not found persuasive because while there may be some overlap between the various inventions the separate searches would be neither duplicative nor without undue burden.

As to the argument regarding claim 14, which is argued to be "a linking claim phrased in means plus function format." The claim is properly restricted because claim 1-13 are drawn to a method and claim 14 is drawn to an apparatus for its practice. The apparatus as claimed can be used to practice another and materially different process, specifically a heater. A different and additional search will be required to find the structural element corresponding to the "means for absorbing sufficient energy in the one or more particles, the surface, the sample and/or the energy transfer medium to dislodge the one or more particle(s)". As to independent claims 15 and 16 and dependant claim 17, no argument was made as why the restriction was improper, and as such the restriction is deemed proper.

2. The requirement is still deemed proper and is therefore made FINAL.

Specification

3. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

The following title is suggested:

Method of Removal of Minute Particles using Thermophoresis

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claim 1-3, 6-9, 10, and 11 is rejected under 35 U.S.C. 102(b) as being anticipated by the reference: J. Appl. Phys., Vol 71, No. 7, 1 April 1992, to Tam et al. Hereinafter (RR, corresponding to its IDS reference identifier).

5. As to claim 1, disclosing a method of removing one or more particles adhered to a surface of a sample, (figure 3a showing particles on a surface and see associated text disclosing that the articles are to be removed). Claim 1 further discloses the step of arranging an energy transfer medium under and around the one or more particles. The same is illustrated in figure 3 and relevant associated text. Claim 1 further discloses irradiating the one or more particle(s), the surface and/or the energy transfer medium with laser energy. Figure 3 and relevant associated text, especially at page 3518 section 1 line 8 discloses a “pulsed laser”. The claim goes on to indicate that the one or more particle(s), the surface, the substrate, and/or the energy transfer medium absorb sufficient energy in to dislodge the one or more particles. The RR reference discloses “strongly absorbed by the substrate surface” resulting in “explosive evaporation” thus removing the particle. The claim goes on to disclose the step of creating a temperature gradient adjacent to the surface to prevent the one or more particles from redepositing on the surface.

Inherently the duration of the laser pulse will result in a thermal gradient, and the thermal gradient will inherently behave the same way because the claimed and disclosed method steps are identical.

6. As to claim 2, disclosing that the irradiating step comprises irradiating the energy transfer medium with laser energy, and said absorbing step comprises absorbing sufficient energy in the energy transfer medium to cause explosive evaporation thereof with sufficient force to dislodge the one or more particles. The same is disclosed in figure 3 (c) and relevant associated text. See also section 2 at page 3520.

7. As to claim 3, disclosing that the step of creating a temperature gradient adjacent to the surface to prevent the one or more particles from redepositing on the surface comprises heating the sample. As shown in figure 3(a) the strong substrate absorption would inherently heat the particle. Also disclosed at

8. As to claim 6, further limiting claim 2 and disclosing that the laser energy is sufficient to be absorbed by the energy transfer medium, either directly or by conduction from the substrate. See figure 3(a), (b), and relevant associated text. With respect to figure 3a the medium is heated by the substrate. In figure 3b, both the substrate and the medium are heated.

9. As to claims 7-9 further limiting claim 2 and disclosing that the energy transfer medium is at least one of a uniform layer of thickness, absorbed into interstices under and around the one or more particle(s) to be removed, and a combination thereof.

10. With specific respect to claim 8 further limiting claim 7, and disclosing that the energy transfer medium is a uniform layer of thickness, the same is disclosed in figure 3(a)-(c) and at page 3519 in the first paragraph of the second column. Discussing various techniques to ensure a uniform thickness.

11. With specific respect to claim 9 further limiting claim 7 and disclosing that the energy transfer medium is absorbed into interstices under and around the one or more particle(s) to be removed. This is disclosed the same is disclosed in figure 3(a)-(c) and at page 3519 in the first paragraph of the second column. Discussing various techniques to reduce surface tension which would inherently result in interstice filling.

12. As to claim 10, disclosing a method of removing one or more particles adhered to a surface of a sample, (figure 2a showing particles on a surface and see associated text disclosing that the articles are to be removed). Claim 10 further discloses irradiating the one or more particles/sample combination with laser energy. See figure 2(a) and (b) and relevant associated text, especially at page 3517 section 2. The drawing and relevant associated text discloses strong particle absorption. Claim 10 further discloses absorbing sufficient energy in the one or more particle(s)/sample combination to dislodge the one or more particle(s); The same is disclosed in see e.g. column 2, section 2. Finally claim 10 discloses creating a temperature gradient adjacent to the surface to prevent the one or more particle(s) from redepositing on the surface. The temperature gradient inherently will exist as method the steps are identical.

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13. As to claim 11, disclosing that the step of creating a temperature gradient adjacent to the surface to prevent the one or more particle(s) from redepositing on the surface comprises heating the sample. Figure 2(a) and relevant associated text discloses heating the sample.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

14. Claims 4, 5, 12, and 13 rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of RR and United States Patent No. 4,987,286 to Allen (Allen).

15. As to claims 4 and 5, each and every limitation of claim 4 and claim 5 is identically disclosed in the rejection of claim 1, as set forth above, except that RR apparently does not explicitly disclose the step of creating a temperature gradient adjacent to the surface to prevent the one or more particles from redepositing on the surface. Wherein the step comprises cooling a plate disposed adjacent to the surface of the sample. Allen discloses the step of creating a temperature gradient adjacent to the surface.

16. One of ordinary skill in the thermophoresis art would have been motivated to make the instant combination for the reasons explicitly set forth in Allen, namely enhanced adsorption into

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the capillary spaces, thus allowing for improved cleaning see e.g. column 6, line 52 *et seq.*

Specifically, Allen discloses “[i]n many cases it is preferable to dose the surface with liquid while maintaining the system at a reduced temperature *** in order to enhance adsorption into the capillary spaces.”

17. Inherently either the substrate cools the substrate support, or alternatively the support is cooled directly. See e.g. column 6, line 52. See also figures 4 and 5, especially element 72, and relevant associated text disclosing a functional equivalent, namely a vacuum source,

18. As to claims 12 and 13, each and every limitation of claim 12 and claim 13 is identically disclosed in the rejection of claim 10, as set forth above, except that RR apparently does not explicitly disclose the step of creating a temperature gradient adjacent to the surface to prevent the one or more particles from redepositing on the surface. Wherein the step comprises cooling a plate disposed adjacent to the surface of the sample. Allen discloses the step of creating a temperature gradient adjacent to the surface. One of ordinary skill in the thermophoresis art would have been motivated to make the instant combination for the reasons explicitly set forth in Allen, namely enhanced adsorption into the capillary spaces, thus allowing for improved cleaning see e.g. column 6, line 52 *et seq.* Specifically, Allen discloses “[i]n many cases it is preferable to dose the surface with liquid while maintaining the system at a reduced temperature in order to enhance adsorption into the capillary spaces.”

19. Inherently either the substrate cools the substrate support, or alternatively the support is cooled directly. See e.g. column 6, line 52. See also figures 4 and 5, especially element 72, and relevant associated text disclosing a functional equivalent, namely a vacuum source,

Conclusion

Applicant is thanked for a well-prepared and thorough IDS. During the examination process it was noted that a small number of the references were not in the file. Examiner Winter telephoned Applicant's Representative Carol L. Druzbeck and informed her that the documents were missing. Unfortunately the documents were not immediately available (potentially with the inventor or out of print or both), it was decided that an Office action would issue using the documents present and that in the Office action response the additional documents would be provided as they could be obtained.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Gentle E. Winter whose telephone number is (703) 305-3403. The examiner can normally be reached on Monday-Friday 7:00-3:30.

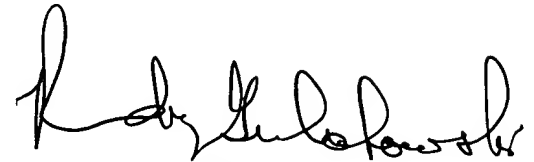
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Randy P. Gulakowski can be reached on (703) 308-4333. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9310 for regular communications and (703) 872-9311 for After Final communications. The direct fax number for this examiner is (703) 746-7746.

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

Gentle E. Winter
Examiner
Art Unit 1746

May 30, 2003

A handwritten signature in black ink, appearing to read "Randy Gulakowski", written in a cursive style.

RANDY GULAKOWSKI
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1700